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Isolated Dislocation of the Carpal Scaphoid: A Case Report

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An isolated dislocation of the carpal scaphoid is rare, and a significant radiological finding that distinguishes dislocation of the scaphoid from perilunate dislocation is the volar and radial displacement of the proximal pole of the scaphoid from the scaphoid fossa of the radius. In review of the literature, the standard methods of treatment have not been established. In some reports, dislocation of the scaphoid has been successfully treated with cast immobilization after closed reduction¹⁻⁵⁾. Other reports have advocated open reduction and internal fixation as treatment for dislocation of the scaphoid⁵⁻¹³⁾. In this paper, we present a case in which open reduction with internal fixation was required after failed closed reduction. The mechanism of dislocation of the scaphoid and a treatment approach are also discussed.

Case Report

A fifty-seven-year-old man sustained an injury of the left, non-dominant wrist in a motor-vehicle collision while driving the vehicle. In the emergency room on the day of the injury, left wrist was painfully swollen in a position of ulnar deviation. There were tenderness and a palpable prominence over the radial aspect of left carpus. The neurovascular status was found to be normal. Radiographs revealed a radiovolar dislocation of left scaphoid (Figs. 1-A and 1-B). In addition, the patient sustained a fracture of right acetabulum.

Under local anesthesia, reduction of the proximal pole of the scaphoid to the scaphoid fossa of the radius was attempted with manual pressure over the palpable osseous prominence under longitudinal traction in a position of ulnar deviation. However, subsequent review of radiographs demonstrated a scapholunate diastasis. Next day after the injury, attempts at closed reduction under regional anesthesia with fluoroscopic control failed because of a persistent scapholunate diastasis (Fig. 2-A). Fluoroscopic examination revealed a lack of synchronous motion between the scaphoid and the lunate (Fig. 2-B). Open reduction with pinning was performed through a volar approach. Notable intraoperative findings included complete tears of the volar radioscaphocapitate ligament and of the scapholunate interosseous ligament which was invaginated in the scapholunate interval to block reduction. After extrication of the invaginated ligament, the diastasis was reduced. Two smooth Kirschner wires were drilled; one between the scaphoid and the lunate and one between the scaphoid and the hamate through the capitate (Figs. 3-A and 3-B).

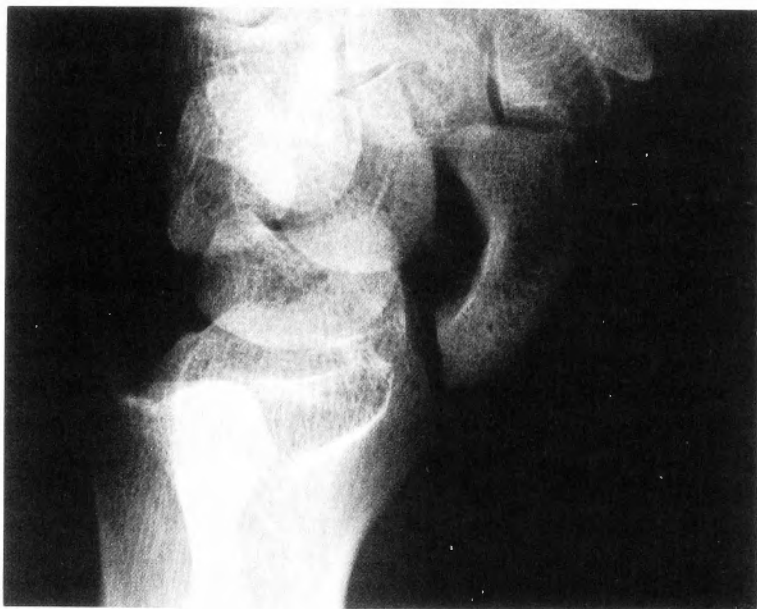
Postoperatively, an above-elbow thumb-spica cast was applied for four weeks. A below-the-

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索引用語: 舟状骨, 脱臼, 舟状骨脱臼, 手術

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elbow thumb-spica cast was worn for another four weeks. The pins were removed at eight weeks, and therapy was begun to restore motion and strength. At the latest follow-up, two years postoperatively, the patient was pain-free and had full motion of the wrist. There was no clinical or radiological evidence of carpal instability, avascular necrosis, or osteoarthritis (Figs. 4-A and 4-B).



Figs. 1-A and 1-B Anteroposterior (A) and oblique (B) radiographs showing acute radiovolar dislocation of the scaphoid.

Discussion

Isolated dislocation of the carpal scaphoid was rarely encountered. To our knowledge, thirteen reports of seventeen patients have described radiovolar dislocation of the scaphoid in the English-language literature^{1,3-10,12-15}. The mechanism of dislocation of the scaphoid is uncertain. From studies of perilunate dislocation and fracture of the scaphoid, extension of the wrist, intercarpal supination and ulnar deviation have been suggested to be involved in the dislocation¹⁶. In the current case, together with the previously reported cases¹³, drivers involved in motor-vehicle accidents sustained dislocation of the scaphoid. This indicates that the transmission of force to the wrist through the steering wheel or shift lever may predispose to this dislocation¹³.

It is important to recognize dislocation of the scaphoid as the result from periscaphoid ligament damage. The stabilizing ligaments of the proximal pole and the waist of the scaphoid are the radioscaphocapitate ligament, the scapholunate interosseous ligament, and the long radiolunate ligament. Besides those ligaments, the scaphotrapezial ligament and the scaphocapitate ligament, which are considered important elements of stable carpal relationships, stabilize the distal pole from its volar surface^{17,18}. The radioscapholunate ligament has been proved to act only as a neurovascular conduit without substantial stabilizing function¹⁹. The radioscaphocapitate ligament plays a role as a fulcrum in motion of the scaphoid in the sagittal plane. Injury of the scaphotrapezial and scaphocapitate ligaments combined with injury of the scapholunate interosseous ligament probably causes scapholunate instability after perilunate dissociation. Furthermore, the scaphotrapezial and scaphocapitate ligaments have been suggested to function as a pivot for dislocation of the scaphoid^{18,20}. On the basis of the arthroscopic findings in dislocation of the scaphoid, SZABO et al have ad-



Fig. 2-A Anteroposterior radiograph in a neutral position of the wrist taken after closed reduction, demonstrating a persistent scapholunate diastasis with avulsed fragments.

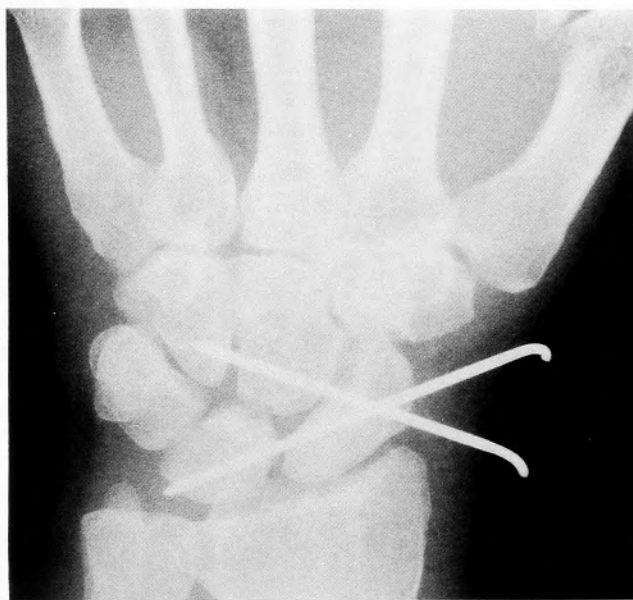
vocated that periscaphoid ligament failure initiates in the radiovolar aspect of the proximal pole with failure of the radioscapohcapitate and scapholunate interosseous ligaments in association with dislocation of the proximal pole of the scaphoid. Thereafter, the ligament failure progresses to the long radiolunate ligament, and ends with the scaphotrapezial ligament in association with dislocation of the distal pole of the scaphoid¹³⁾. Arthroscopy will provide useful information about ligamentous injuries and become an essential tool in case of scaphoid dislocation¹³⁾.

In regard to treatment of dislocation of the scaphoid, successful management with immobilization after closed reduction has been reported^{1,3-10,12)}. However, while obtained initial anatomical reduction, closed reduction of perilunate dislocation tends to result in reduction²¹⁾. Similar to perilunate dislocation, association of dislocation of the scaphoid with periscaphoid ligamentous injuries could lead to failed closed reduction or redislocation after initial closed reduction^{5,13,14)}. Therefore, percutaneous pinning is recommended to maintain reduction in a cast. Immobilization in a cast is necessary to supplement the percutaneous fixation, although the selection of above-the-elbow or below-the-elbow cast and duration of immunobilization are still controversial¹³⁾. Presence of a residual scapholunate diastasis after initial closed reduction requires fluoscopic examination. If fluoroscopy demonstrates synchronous motion between the scaphoid and the lunate, indicating incomplete tear of the scapholunate interosseous ligament, arthroscopy may be helpful for evaluation and removal of possible soft-tissue interposition and percutaneous pinning instead of open reduction¹³⁾. In contrast, when there is dyssynchronous motion between the scaphoid and the lunate as in the current case (Fig. 2-B), indicative of complete tear of the scapholunate interosseous ligament, open reduction with pinning is the option for the treatment¹³⁾. Dorsal approach is considered feasible to



Fig. 2-B Anteroposterior radiograph in a position of wrist extension, showing widening of the scapholunate diastasis.

repair the scapholunate interosseous ligament, if necessary. In the current case, operation was performed through volar approach to avoid damaging the dorsal blood supply to the scaphoid. Open reduction and internal fixation is also indicated at the failure of closed reduction of the proximal pole of the scaphoid due to the lack of an intact hinge at the distal pole of the scaphoid. In such dislocations, careful long-term follow-up is mandatory because severe stripping of ligamentous attachment from the scaphoid may disturb blood supply and cause avascular necrosis despite anatomical reduction¹³.



Figs. 3-A and 3-B Anteroposterior (A) and lateral (B) radiographs made after open reduction and internal fixation.

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Figs. 4-A and 4-B Anteroposterior (A) and oblique (B) radiographs taken two years postoperatively.

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和文抄録

手舟状骨単独脱臼の1例

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安田 義

徒手整復はできず観血的整復が必要であった手舟状骨単独脱臼の1例を経験したので報告する。

【症例】57歳，男性．車の運転中衝突事故で左手舟状骨に脱臼をきたした．徒手整復を試みるも損傷靱帯の介在による舟状骨月状骨離開が残存したため，観血的に整復固定した．術後経過は良好で，不安定性，骨壊死も認めない．

手舟状骨単独脱臼は稀であり，未だ確立した治療法はない．徒手整復に成功した報告もあるが，今までの報告例と月状骨周囲脱臼の治療成績から考えると pinning を併用することが望ましい．再脱臼する場合若しくは本例のように舟状骨月状骨離開が残存する場合には観血的手術が必要となる．舟状骨脱臼に伴う靱帯損傷の評価に関節鏡が今後有用になると思われる．